

Virtual NIH Workshop Handout

New Tools to Explore the Biology of Bacterial Polysaccharides

Co-Chairs

Dr. Catherine Leimkuhler Grimes, Chair, CF-GSP Tools Group & Professor, Department of Chemistry & Biochemistry, University of Delaware

&

Dr. Danielle Dube, ACS CARB Division Secretary & Professor of Chemistry & Biochemistry, Bowdoin College

September 14, 2020

Sponsored by

Common Fund Glycoscience Program



&

Division of Carbohydrate Chemistry of the American Chemical Society



Thank you all for participating in the workshop. It is our ultimate goal to share the tools that this group is/has developed and applied with a diverse group of scientists.

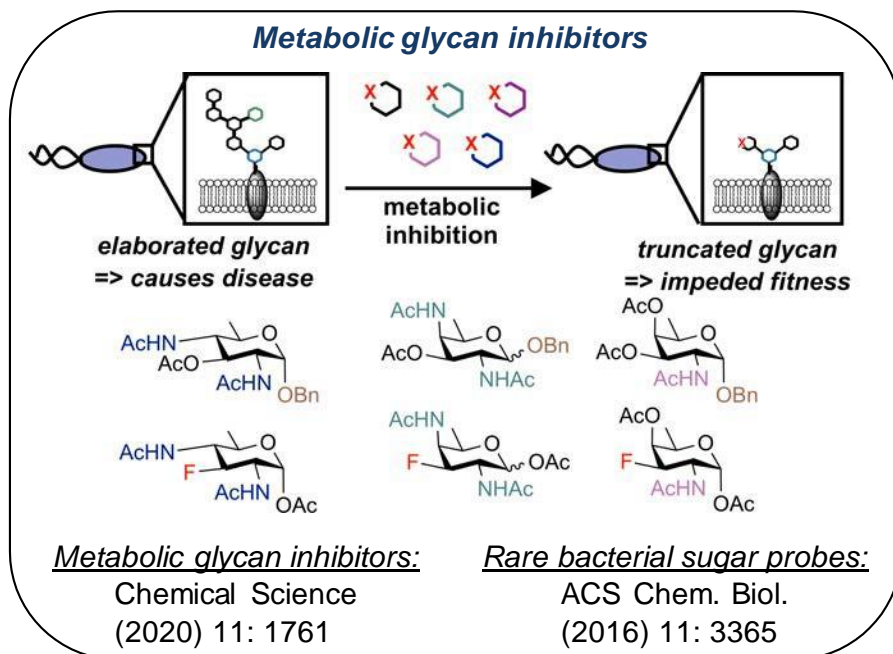
Finding Synergies and Filling Gaps



The presenters have graciously agreed to present their work at the meeting and engage in genuine conversations regarding use of the tools they are developing. Many are able to provide samples of the carbohydrate probes or binding proteins.

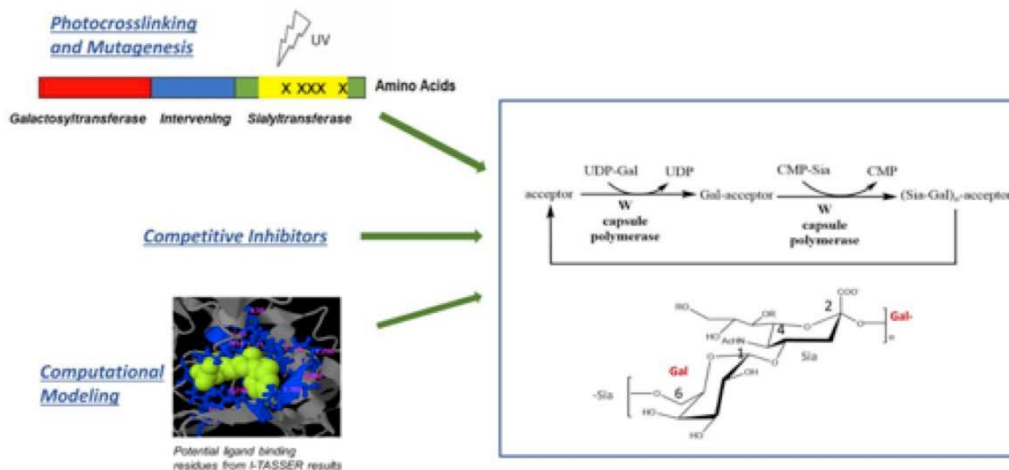
*Below you will find a snap-shot of each presentation,
along with relevant contact information.
Please use this handout as a reference guide for your work with microbes.*

Tools & Contacts:



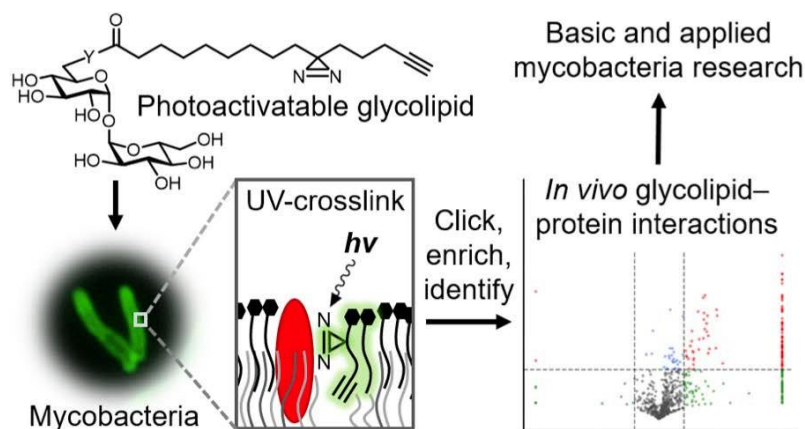
Dr. Danielle Dube (ddube@bowdoin.edu), ACS CARB Division Secretary, Professor of Chemistry & Biochemistry, Biochemistry Program Director, Bowdoin College, **Metabolic inhibitors of bacterial glycan biosynthesis**

Strategies to Investigate *Neisseria meningitidis* serogroup W capsule polymerase



Dr. Pumtiwitt McCarthy (pumtiwitt.mccarthy@morgan.edu), Chair, ACS Maryland Section & Associate Professor, Department of Chemistry, Morgan State University **Interdisciplinary strategies to investigate biosynthesis of *Neisseria meningitidis*-derived polysaccharides**

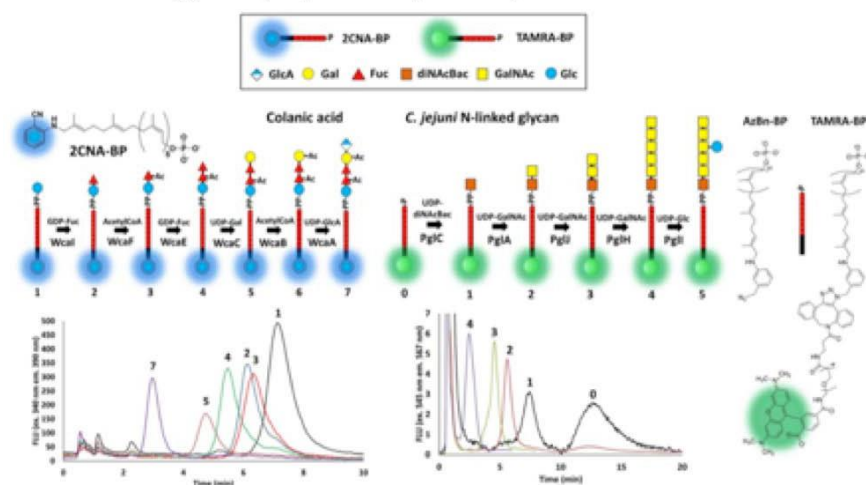
Clickable and photoactivatable glycolipid probes for investigating the mycobacterial outer membrane



JACS (2012) 134:16123; *ACIE* (2016) 55:2053; *JACS* (2020) 142:7725

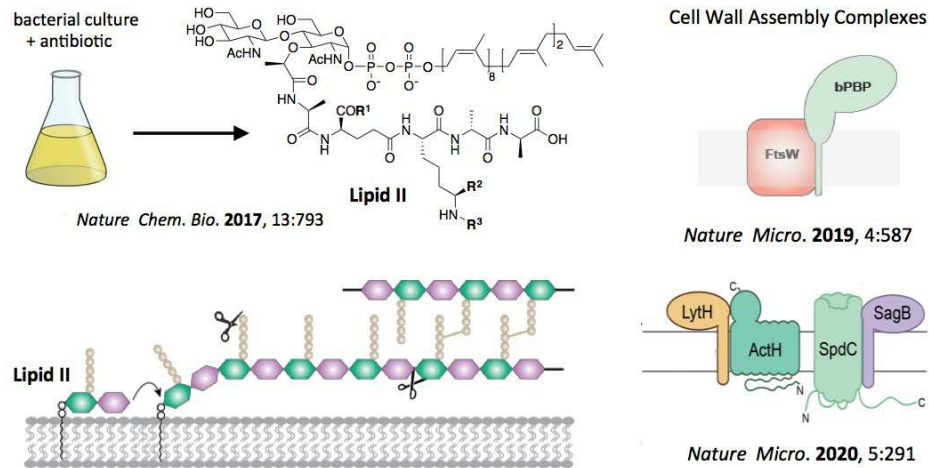
Dr. Benjamin M. Swarts (swartlbm@cmich.edu), Associate Professor, Department of Chemistry & Biochemistry, Central Michigan University *Chemical tools for probing glycolipid dynamics and protein interactions in Mycobacteria*

Tagged Polyisoprenoid Glycan Biosynthesis Probes



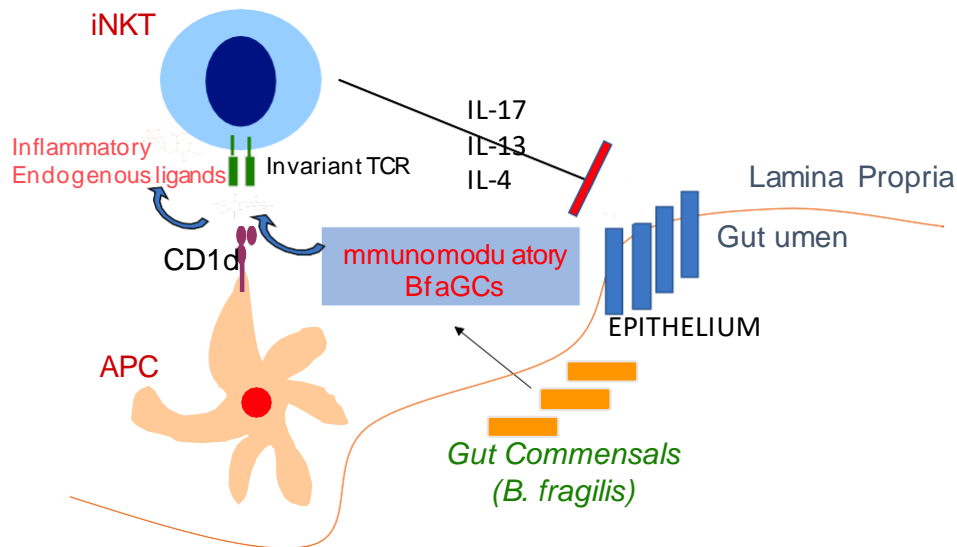
Dr. Jerry Troutman (jerry.troutman@uncc.edu), Associate Professor of Chemistry, University of North Carolina at Charlotte *Tagged polyisoprenoids for the investigation of bacterial polysaccharide biosynthesis pathways*

Cell wall assembly from Lipid II

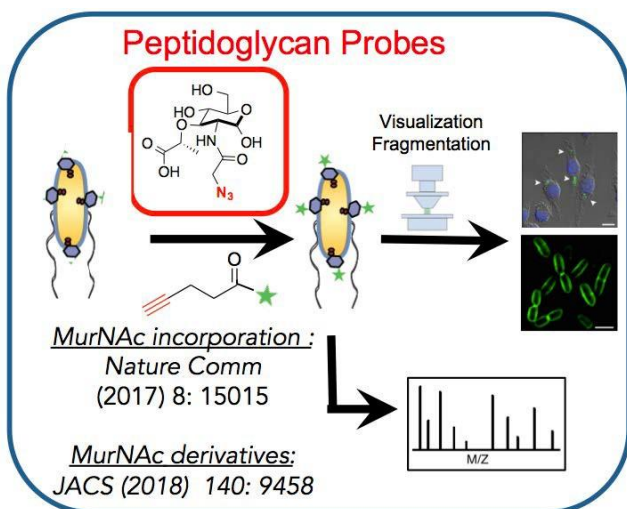


Dr. Suzanne Walker (Suzanne_walker@hms.harvard.edu), Professor of Microbiology, Department of Microbiology, Harvard Medical School ***Tools to study assembly and degradation of the bacterial cell wall***

Branched sphingosine chain is critical structural moiety of *B. fragilis* α GC and protects against iNKT cell mediated inflammation



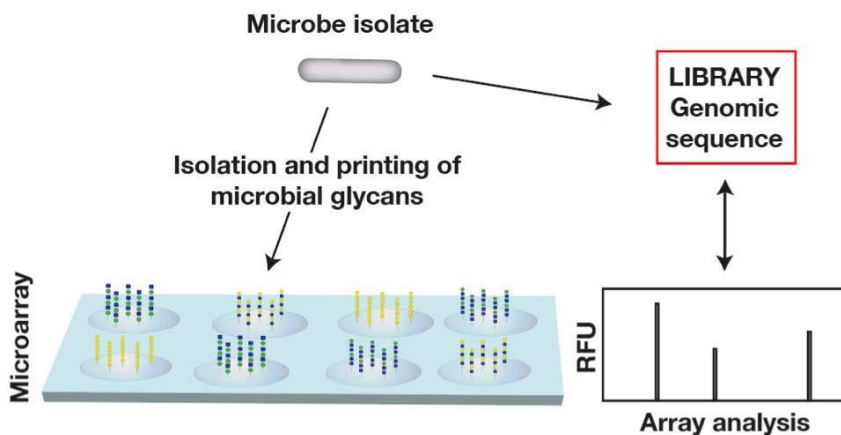
Dr. Dennis L. Kasper (dennis_kasper@hms.harvard.edu), William Ellery Channing Professor of Medicine and Professor of Immunology, Department of Immunology, Blavatnik Institute, Harvard Medical School ***Bacterial glycosphingolipids and immunomodulation on iNKT cells***



Dr. Catherine Leimkuhler Grimes (cgrimes@udel.edu), Chair, CF-GSP Tools Group & Professor, Department of Chemistry & Biochemistry, University of Delaware &

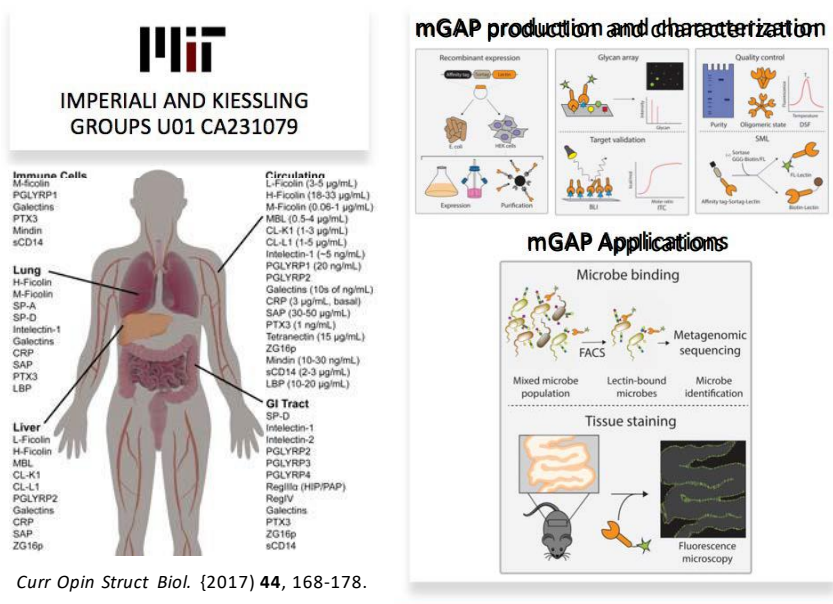
Dr. Nina Salama, Dr. Penny E. Petersen Memorial Chair for Lymphoma Research; Professor, Human Biology Division; Professor, Public Health Sciences Division; Affiliate Professor, Basic Sciences Division, Fred Hutchinson Cancer Research Center, *Probes to track and illuminate bacterial peptidoglycans*

Generation and Integration of Microarrays with Genomic Databases



Dr. Sean Stowell, Medical Director, Center for Apheresis, Brigham and Women's Hospital, Joint Program in Transfusion Medicine, Harvard Medical School *Use of Carbohydrate Binding Probes to Define Novel Host-Microbial Interactions*

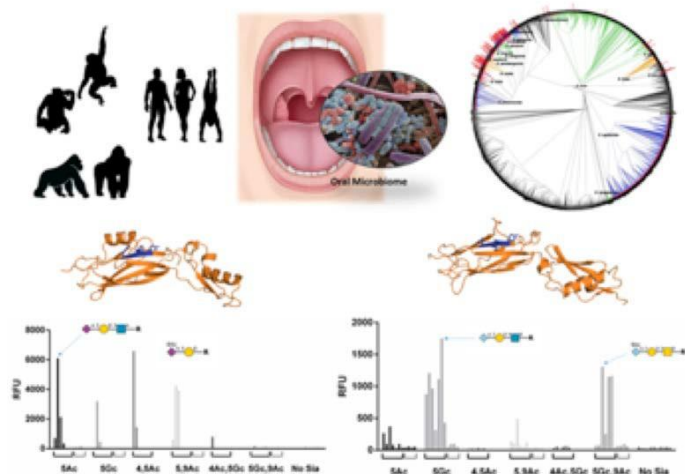
MICROBIAL GLYCAN ANALYSIS PROBES INSPIRED BY HUMAN LECTINS



Dr. Laura L. Kiessling (kiesslin@mit.edu), Novartis Professor of Chemistry, Massachusetts Institute of Technology *Probes of Polysaccharide Assembly in Bacteria*

Dr. Barbara Imperiali (imper@mit.edu), Professor of Biology and Chemistry, Massachusetts Institute of Technology *Filling the GAP with mGAPs {Microbial Glycan Analysis Probes}*

Oral Microbiome Derived Sialic Acid Binding Probes



Dr. Stefan Ruhl (shruhl@buffalo.edu), Professor and Associate Chair, Department of Oral Biology, School of Dental Medicine, University at Buffalo *Harnessing the Oral Microbiome to Create Novel Glycan-Binding Probes*

Glycoscience Common Fund --- Sources of Glycans & Standards

The NIH Common Fund Glycoscience Program's investigators are synthesizing glycans/glycan libraries, and some have commercialized these efforts. If you have specific need(s) for glycans please contact [Dr. Pohl](#) who heads the programs synthetic effort and/or [Dr. Marino](#) to discuss.

In addition, several companies are supported through the SBIR/STTR program to develop [New Technologies for Glycoscience](#). Their (and others) resources can be found on the Common Fund Website under the [Other Resources tab](#).